

## **REMARKS**

### **I. Introduction**

With the cancellation herein without prejudice of claim 15, claims 1 to 14 and 16 to 34 are pending in the present application. In view of the foregoing amendments and the following remarks, it is respectfully submitted that all of the presently pending claims are allowable, and reconsideration is respectfully requested.

### **II. Rejection of Claims 1, 2, 8, 9, 18, 19, 25 and 26 Under 35 U.S.C. § 102(b)**

Claims 1, 2, 8, 9, 18, 19, 25 and 26 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 4,593,658 ("Moloney"). Applicants respectfully submit that Moloney does not anticipate the present claims as amended herein for at least the following reasons.

Claim 1 relates to an apparatus for charging a piezoelectric element, claim 8 relates to a method for charging a piezoelectric element, claim 18 relates to an apparatus for charging a piezoelectric element, and claim 25 relates to a method for charging a piezoelectric element. One aspect of the apparatus and method as described in the present application is not to compensate for any changes, for example, of a thickness of a piezoelectric element, that occur during operation of the piezoelectric element. Rather, an aspect of the apparatus and method as described in the present application is compensation for deviations of individual piezoelectric elements that arise by the **manufacturing process**. Thus, for example, different thicknesses of individual piezoelectric elements, which may not be avoided due to tolerances of the manufacturing process, are to be compensated for in accordance with an apparatus and method hereof. Compensation of deviations of different piezoelectric elements that are caused by the manufacturing process is described, for example, in connection with Figure 7 of the present application.

Thus, for example, the Specification states at page 27, lines 9 to 14 that "if the performance of the piezoelectric element changes due to, for example, such factors as aging or manufacturing variations, the valve can not be positioned in an optimal position by using the aforementioned voltage" and that "the voltage has to be adjusted to account for the changes in actuator behavior, especially its lift."

As described in the present application, adjustment of the voltage is performed as follows. Following the manufacturing of a piezoelectric element, the

latter's path of movement (lifting distance  $h_{\text{actual}}$ ) is measured. This measurement is a component of the manufacturing process of the piezoelectric element. In this connection, the Examiner's attention is respectfully directed, for example, to the last paragraph of page 27 and to the first paragraph of page 28 of the Specification. For example, the Specification states at page 27, line 33 to page 28, line 3 that " $h_{\text{actual}}$  is the lifting distance traveled by the piezoelectric element and can be measured directly after the manufacturing of the piezoelectric element as one part of the manufacturing process."

This actual lifting distance  $h_{\text{actual}}$  is then related to a provided standard value for the lifting movement of the piezoelectric element (standard travel  $h_{\text{norm}}$ ). In this connection, the Examiner's attention is respectfully directed to equation (2) and to the associated explanations on page 28 of the Specification.

The value  $K$  specified in equation (2) represents a corrective value, with which it is possible to compensate the deviations caused by the manufacturing process. For each individual piezoelectric element, this corrective value  $K$  is ascertained on the basis of a measurement during the manufacturing process and is stored.

In the operation of the piezoelectric elements, the respectively associated corrective value  $K$  is queried and taken into account in the activation of the piezoelectric element. This follows from Figure 7, and there specifically from Block 2502. Furthermore, the Examiner's attention is respectfully directed to page 27, lines 21 to 24, which state that "a compensation unit (e.g., 20502 in Fig. 7) can be devised to compensate for batch variations in the piezoelectric element's travel such that the fuel/air mixture is accurately dispensed."

Claim 1 has been amended herein without prejudice to recite that the control unit determines an activation voltage and an activation charge value as a function of a correction factor, which correction factor is measured in accordance with a manufacturing process. Claim 8 has been amended herein without prejudice to recite that an activation voltage and an activation charge value are determined as a function of a correction factor, which correction factor is measured as a part of a manufacturing process. Claim 18 has been amended herein without prejudice in a manner analogous to claim 1, and claim 25 has been amended herein without prejudice in a manner analogous to claim 8.

Moloney purports to relate to a valve operating mechanism for internal combustion and like-valved engines. In stark contrast to claims 1, 8, 18 and 25, Moloney relates to the adjustment of activation of a piezoelectric element during operation. Effects of, e.g., aging, which result over the service life of the piezoelectric element, are compensated for by correspondingly different activations. Moloney, however, makes no mention of compensating for deviations that arise originally in a manufacturing process, e.g., thickness of different piezoelectric elements. That is, Moloney does not describe adjustments to compensate for two piezoelectric elements of the same type that may have different thicknesses due to manufacturing-related tolerances. As indicated above, according to the present claims, a correction factor is measured as part of a manufacturing process and is used to determine an activation voltage and an activation charge value.

Since Moloney does not disclose, or even suggest, all of the features recited in amended claims 1, 8, 18 and 25, it is respectfully submitted that Moloney does not anticipate amended claims 1, 8, 18 and 25.

As for claim 2, which depends from claim 1 and therefore includes all of the features of claim 1, it is respectfully submitted that Moloney does not anticipate dependent claim 2 for at least the same reasons more fully set forth above in support of the patentability of claim 1.

As for claim 9, which depends from claim 8 and therefore includes all of the features of claim 8, it is respectfully submitted that Moloney does not anticipate dependent claim 9 for at least the same reasons more fully set forth above in support of the patentability of claim 8.

As for claim 19, which depends from claim 18 and therefore includes all of the features of claim 18, it is respectfully submitted that Moloney does not anticipate dependent claim 19 for at least the same reasons more fully set forth above in support of the patentability of claim 18.

As for claim 26, which depends from claim 25 and therefore includes all of the features of claim 25, it is respectfully submitted that Moloney does not anticipate dependent claim 26 for at least the same reasons more fully set forth above in support of the patentability of claim 25.

In view of all of the foregoing, withdrawal of this rejection is respectfully requested.

**III. Rejection of Claims 3 to 7, 10 to 14, 20 to 24 and 27 to 31 Under 35 U.S.C. § 103(a)**

Claims 3 to 7, 10 to 14, 20 to 24 and 27 to 31 were rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Moloney and U.S. Patent No. 5,384,507 ("Takada et al.") or U.S. Patent No. 6,340,858 ("Jaenker"). Applicants respectfully submit that the combination of Moloney and Takada et al. or Jaenker does not render unpatentable the present claims for at least the following reasons.

Claims 3 to 7 ultimately depend from claim 1 and therefore include all of the limitations of claim 1, claims 10 to 14 ultimately depend from claim 8 and therefore include all of the limitations of claim 8, claims 20 to 24 ultimately depend from claim 18 and therefore include all of the limitations of claim 18, and claims 27 to 31 ultimately depend from claim 25 and therefore include all of the limitations of claim 25. As more fully set forth above with respect to claims 1, 8, 18 and 25, Moloney does not disclose, or even suggest, all of the limitations of amended claims 1, 8, 18 and 25. Takada et al. and Jaenker are not relied on for disclosing or suggesting the limitations of claims 1, 8, 18 and 25 not disclosed or suggested by Moloney. Indeed, it is respectfully submitted that neither Takada et al. nor Jaenker discloses, or even suggests, the limitations of claims 1, 8, 18 and 25 not disclosed or suggested by Moloney. It is therefore respectfully submitted that the combination of Moloney and Takada et al. or Jaenker does not render unpatentable claims 3 to 7, 10 to 14, 20 to 24 and 27 to 31. In view of all of the foregoing, withdrawal of this rejection is respectfully requested.

**IV. Rejection of Claims 15 to 17 and 32 to 34 Under 35 U.S.C. § 103(a)**

Claims 15 to 17 and 32 to 34 were rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Moloney, Takada et al. or Jaenker and U.S. Patent No. 5,575,264 ("Barron") or U.S. Patent No. 6,247,451 ("Estevenon et al."). Applicants respectfully submit that the combination of Moloney, Takada et al. or Jaenker and Barron or Estevenon et al. does not render unpatentable the present claims for at least the following reasons.

As an initial matter, claim 15 has been canceled herein without prejudice, thereby rendering moot the present rejection with respect to claim 15.

Claims 16 and 17 ultimately depend from claim 8 and therefore include all of the features of claim 8, and claims 32 to 34 ultimately depend from claim 25

and therefore include all of the features of claim 25. As more fully set forth above with respect to claims 8 and 25, Moloney does not disclose, or even suggest, all of the limitations of amended claims 8 and 25. As more fully set forth above with respect to claims 8 and 25, the combination of Moloney and Takada et al. or Jaenker does not disclose, or even suggest, all of the limitations of amended claims 8 and 25. Neither Barron nor Estevenon et al. is relied on for disclosing or suggesting the limitations of claims 8 and 25 not disclosed or suggested by Moloney, Takada et al. or Jaenker. Indeed, it is respectfully submitted that neither Barron nor Estevenon et al. discloses, or even suggests, the limitations of claims 8 and 25 not disclosed or suggested by Moloney, Takada et al. or Jaenker. It is therefore respectfully submitted that the combination of Moloney, Takada et al. or Jaenker and Barron or Estevenon et al. does not render unpatentable claims 16, 17 and 32 to 34.

In view of all of the foregoing, withdrawal of this rejection is respectfully requested.

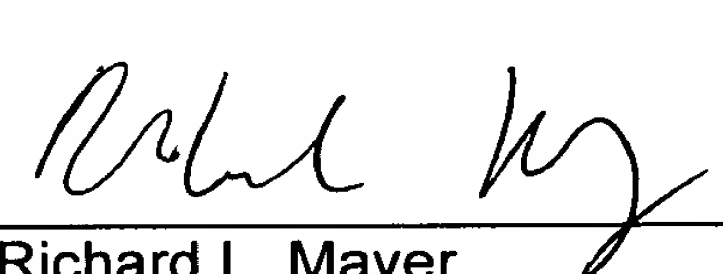
**V. Conclusion**

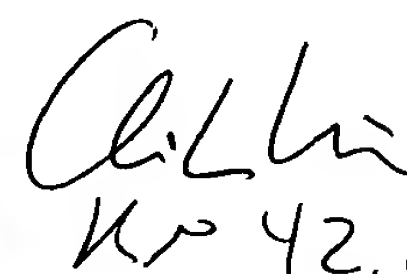
It is therefore respectfully submitted that all of the presently pending claims are allowable. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

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